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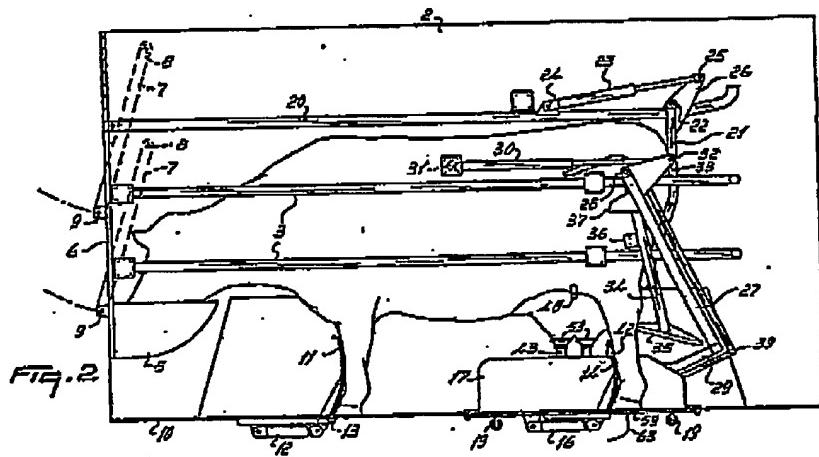
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(54) Implement for milking animals.

(57) The object is to provide an implement for milking animals, such as cows, in which an effective positioning of the animal is effected, in which the milking cluster (65) can be applied in an efficient and/or a reliable manner and in which the milking procedure can be performed efficiently. Therefore at least one hind leg of the animal can be displaced in the lateral direction, for example by moving a part of the floor (17, 18) of the milking parlour in that direction. Furthermore, a sensor (62) can be arranged to detect whether the legs of the animal are in a predetermined place. To facilitate the application of the milking cluster (65), the teat cups (43) may be spring-loaded relative to a holder and the teat cups (43) may also be provided with a funnel-shaped catching device (53). The milking cluster (65) can be applied automatically.



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IMPLEMENT FOR MILKING ANIMALS

The invention relates to an implement for milking animals, such as cows, comprising at least one milking parlour and at least one milking machine. In such an implement the milking parlour is provided with means, for example a rod system, for guiding the animal to the position desired for milking. Especially with an increasing automation of the milking procedure it is not only of importance to bring the animal in a desired place, but it is also important to adjust the animal to an appropriate posture, a proper accessibility of the udder and a predetermined location of the udder being desired.

The invention has for its object to provide an implement for milking animals, such as cows, in which an effective positioning of the animal is effected and in which the milking procedure can be performed efficiently.

To that end, according to the invention, the milking parlour includes means for forcing the animal to move at least one hind leg in the lateral direction. By laterally moving one or both hind legs of the animal the animal can be adjusted to a posture with slightly spread hind legs, which can considerably increase the accessibility of the udder. In addition, because of its spread hind legs the animal is more stable, whilst moving the hind legs is made difficult for the animal, so that it is difficult for the animal to change its posture.

In accordance with a further characteristic of the

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1 invention the means for moving the legs include two upright walls, of which, in accordance with a further feature of the invention, one wall is capable of hinging up and down. The presence of the walls may prevent the 5 animal from moving the relevant leg in an unwanted direction. One wall can be swivelled to a predominantly horizontal position, so that a substantially continuous floor of the milking parlour is obtained when the animal enters the milking parlour.

10 In accordance with an other characteristic of the invention, an upright wall may be fixed to a movable portion of the milking parlour floor, which floor portion can move laterally, in accordance with a further characteristic of the invention, over a distance of approximately 15 20 cms. Alternatively, in accordance with an other feature of the invention, two movable floor portions may be present which can move laterally in opposite directions. When each of the hind legs of the animal is positioned on one of the movable portions, spreading the 20 hind legs can thus be effected efficiently.

In accordance with a further characteristic of the invention, the movable portions of said means can be shifted by means of hydraulic or pneumatic means.

The implement for milking animals, such as cows, 25 comprising at least one milking parlour and at least one milking machine, can furthermore, in accordance with the invention, be characterized in that the milking parlour includes vertically extending means for forcing the animal to assume a predetermined posture.

30 In accordance with a further characteristic of the invention, these means may be provided near the milking parlour floor and these means can include an upwardly extending plate. According to a characteristic of the invention, this plate may have a round upper edge, for 35 example constituted by a tube. Alternatively, the means, in accordance with a further characteristic of the invention, may include two tubes which extend parallel to each other in the forward direction of the animal. Such

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1 tubes have been found to be particularly suitable for guiding the animal.

In accordance with a further characteristic of the invention, at least the rear portion of the vertically extending means may be laterally movable, so that the hind legs of the animal can be moved in the outward direction relative to each other.

10 In accordance with a characteristic of the invention, the distance between the said means and the side wall of the milking parlour, or a lateral guide means for the animal, may be so small that the animal can not stand with four legs between said means and the side wall or the lateral guide means. Thus, the animal is forced to a desired posture, that is to say the two right-hand legs 15 at one side and the two left-hand legs at the other side of the vertically extending means

In accordance with a further characteristic of the invention, the milking parlour may have side walls or lateral guide means whose mutual spacing is approximately 20 equal to the width of the animal, so that the freedom of movement of the animal can be limited to a predetermined extent, thus increasing the certainty that the animal is in the desired position and the desired posture.

The implement for milking animals, such as cows, 25 comprising at least one milking parlour and at least one milking machine may, in accordance with a characteristic of the invention, have a milking parlour entrance located at the same side of the milking parlour as the side from which the milking cluster is applied to the animal's 30 udder. Because of this arrangement, the space required for guiding the animal to the milking parlour may coincide with the space required for applying the milking cluster, so that efficient use of the available space is obtained.

35 In accordance with a further characteristic of the invention, the milking cluster may be swivable around a substantially horizontal axis provided near the posterior of the animal, so that the milking cluster can swivel

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1 through the above-mentioned space to under the animal, more specifically passing between the hind legs. The hinge means for swivelling the milking cluster may, in accordance with a further characteristic of the invention, be provided at both sides of the animal, so that a substantially U-shaped frame is obtained to which the milking cluster is connected and which is suspended capable of hinging by its ends.

In accordance with a further characteristic of the 10 invention, the milking cluster may be swivable by means of hydraulic means. In accordance with a characteristic of the invention, the milking cluster may form part of an automatic milking machine, and the milking cluster may be connectable to the udder of the animal from the rear.

15 In accordance with a characteristic of the invention, the milking parlour may have an entrance door, the relevant milking members passing under the entrance door, being connectable to the animal's udder from the rear side of the animal. In accordance with a further 20 characteristic of the invention, the entrance door may be provided with a tube frame, it being possible for one or more tubes of the tube frame to push the animal forwards. In accordance with a characteristic of the invention, the entrance door may be capable of rotation around a shaft 25 near the upper side of the animal, which swivel shaft may extend substantially horizontally.

A milking parlour of the implement for milking animals, such as cows, comprising at least one milking parlour and at least one milking machine, may in accordance with a characteristic of the invention include 30 one or more sensors which are arranged such that it can be determined whether the animal's legs are in a pre-determined place. Thus, the reliability of the implement can be increased, as the presence of the animal's legs in 35 a certain position is an adequate indication that the animal is in the proper posture. According to a further characteristic of the invention the sensors may be provided on both sides of a central raised portion of the

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1 milking parlour floor and/or the sensors may be provided
in a movable portion of the milking parlour floor.

According to another characteristic of the invention, the implement may comprise an automatic milking machine, which automatic milking machine automatically adapts itself to the physical situation of the animal, which situation can be determined by, for example, measuring the temperature of the milk.

In accordance with a further characteristic of the invention, the implement may include a computer and means may be present for dosing concentrated fodder during milking, the computer controlling dosing of the fodder. In addition, in accordance with a characteristic of the invention, the milking parlour may have doors which can open and close automatically. Alternatively, in accordance with a characteristic of the invention, means may be provided for controlling by means of a computer moving portions of the implement, such as said doors.

In accordance with a characteristic of the invention, the milking parlour may be included in a loose housing (covered yard). Furthermore, according to the invention means may be provided for preventing an upward, a forward or a rearward movement of the animal, which means may be formed by portions of the milking parlour frame, made, for example, of metal or plastics tubes.

In accordance with a characteristic of the invention, means may be provided for automatically milking the animal four or more times a day.

So as to enable the teat cups to be moved relative to each other, the teat cups may, in accordance with a characteristic of the invention, be rotatable around upwardly directed shafts, which rotatability can be driven hydraulically. In addition, the milking cluster may permit of up and down movement by means of a quadrangle hinge-construction, which quadrangle hinge-construction may be a parallelogram-construction, which may be provided near the milking cluster. As a result thereof the milking cluster is movable in a predetermined position in

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1 substantially a vertical direction.

In accordance with a further characteristic of the invention, the teat cups, that is to say the milking cluster can be arranged such that they permit of lateral movement. Alternatively, the milking cluster may be provided rotatably around a pivot shaft at the side wall of the milking parlour. In accordance with an other characteristic of the invention, two hinges may be provided which are interconnected by means of a cross-beam, the milking cluster optionally being swivable to a height higher than the height of the animal, so that the animal can pass under the milking cluster. In accordance with a further characteristic of the invention, the milking cluster may be rotatable through an angle of more than 15 90°, more specifically using hydraulic means.

In accordance with a further characteristic of the invention, the milking parlour floor may be provided with an upwardly hingeable flap which is in front of the fore legs of the animal when it is in the milking parlour. Alternatively, in accordance with an other characteristic of the invention, an upwardly hinging flap may be present for the animal's hind legs, when the animal is in the milking parlour.

In addition, according to the invention, the milking parlour may have an exit door which is of such a structure that it is capable of swivelling upwards, which swivelling action may be effected by hydraulic means.

The milking procedure preferably proceeds automatically. To this end a computer can be used which is programmed such that all the control actions are performed automatically.

The invention furthermore relates to an implement for milking animals, such as cows, comprising at least one milking parlour and at least one milking machine. In such an implement the milking machine includes a milking cluster intended for connection to the animal's udder. Connecting the milking cluster to the udder is a critical stage of the milking procedure and automizing it offers

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1 quite some problems.

The invention has for its object to provide an implement for milking animals, such as cows, in which applying the milking cluster can be effected in an efficient and/or a reliable manner.

To that end, according to the invention, a teat cup of the milking cluster may be provided under spring load relative to an adjacent teat cup to a holder.

In accordance with a further characteristic of the invention, the teat cup may be provided such that it is spring-loaded in the vertical direction, to which purpose, in accordance with a characteristic of the invention, the teat cup is rotatable around an axis located outside the milking cluster. In this situation the milking cluster may include four teat cups which are rotatable around the same, substantially horizontal, axis. By this spring-loaded structure of the individual teat cups of the milking cluster, each teat cup can assume a position in the vertical direction, which is adapted to the shape of the udder of the animal.

In accordance with another characteristic of the invention, a teat cup of the milking cluster is adjustable around an upwardly directed axis, so that relative to the other teat cups the teat cup can be brought to a position adapted to the position of the relevant teat of the udder of the relevant animal. In accordance with a further characteristic of the invention, means are present for automatically coupling the milking cluster, which means, in accordance with a characteristic of the invention, can be such that the milking cluster is applied from the rear of the animal.

In an implement for milking animals, such as cows, comprising at least one milking parlour and at least one milking machine, a teat cup may be provided, in accordance with a further characteristic of the invention, with a substantially funnel-shaped, flexible catching device. Using such a catching device, the relevant teat can be guided into the teat cup, which can significantly

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1 facilitate applying the milking cluster.

In accordance with a further characteristic of the invention, the catching device may have annular portions, which annular portions may have mutually different diameters and may be provided on top of each other. Alternatively, in accordance with a further characteristic of the invention, the catching device may be an integral part of the flexible portion of the teat cup. Such a catching device is in the shape of a funnel whose conical portion has annular stiffening members, thinner and consequently more flexible material possibly being present between these annular stiffening members.

The implement for milking animals, such as cows, comprising at least one milking parlour and at least one milking machine may furthermore, in accordance with the invention, be characterized in that the implement includes at least one orientation means, provided on the animal, in the shape of an object to be detected. Such an orientation means may include electronic components and it may comprise a transmitter or a receiver. In accordance with a further characteristic of the invention, the orientation means can be attached to the double skin of the animal, for example in front of the hind legs, such that the orientation means is substantially in a position over the animal's udder. In accordance with another characteristic of the invention, the orientation means may have two folded ends which can be placed at two sides of the animal's skin and be interconnected by means of a pin.

30 In accordance with a further characteristic of the invention, the orientation means may be applied to both the left-hand and the right-hand side of the animal. The presence of two orientation means can facilitate detection of the posture of the animal and consequently the position of the udder with the teats. Alternatively, in accordance with another characteristic of the invention, an orientation means may be provided on the milking cluster, for example in the form of a sensor

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1 capable of determining the position of the milking cluster with respect to the orientation means attached to the animal.

The implement for milking animals, such as cows,
5 comprising at least one milking parlour and at least one milking machine, may, in accordance with another characteristic of the invention include at least one identifying means provided on the skin of an animal, for identifying the animal. This identifying means may have two
10 folded ends which can be placed on two sides of the animal's skin and be interconnected by means of a pin. In accordance with another characteristic of the invention, such an identifying means can be applied at both the left-hand and the right-hand side of the animal. In
15 accordance with a further characteristic of the invention, the identifying means may comprise electronic components which can produce the required signals. In accordance with a further characteristic of the invention, the identifying means may be provided over the
20 udder of the animal. The identifying means may be combined with the orientation means, so that one means, applied on the animal, serves both for animal recognition (identification) and for positioning (orientation).

The implement for milking animals, such as cows,
25 comprising at least one milking parlour and at least one milking machine may, in accordance with another characteristic of the invention, include a cover device for temporarily covering the milking cluster, more specifically at instants at which the milking cluster is not
30 connected to the animal's udder. In that situation, in accordance with a characteristic of the invention, the milking cluster can be covered by the cover device during a part of its travel. Covering the milking cluster is, for example, important when the milking cluster is near
35 the posterior of the animal, as then the animal might foul the milking cluster.

In accordance with a further characteristic of the invention the milking machine may include an automatic

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1 milking device, which can be connected from the rear of the animal to the animal's udder.

The cover device can, in accordance with a characteristic of the invention, include an approximately 5 horizontally extending plate, the rear end of the plate being at a lower level than its front end when the cover device is in a stationary position. Thus, anything falling on the cover device can be discharged via the rear end of the plate of the cover device.

10 In accordance with another characteristic of the invention, the implement may have a stop for the cover device, so that, during applying of the milking cluster, the cover device releases the milking cluster for the last part of its travel. As a result thereof, the cover 15 device remains in a position near the rear of the animal, whilst the milking cluster advances to under the udder.

In accordance with another characteristic of the invention, the implement may include an automatic milking machine which can automatically adapt itself to the 20 physical situation of the animal, for example by measuring the temperature of the milk, which is an indication for the situation or condition of the animal.

In accordance with a characteristic of the invention, the implement may further comprise a computer 25 and means may be present for metering doses of concentrated fodder during milking, the computer controlling metering the concentrated fodder dose.

In addition, in accordance with a characteristic of the invention, the milking parlour may be provided 30 with doors which can open and close automatically and these doors, and other movements of portions of the implement, can be controlled by the computer.

In accordance with a further characteristic of the invention, the milking parlour may be incorporated in a 35 loose housing (covered yard). In addition, in accordance with a characteristic of the invention, means may be present for preventing an upward, a forward or a rearward movement of the animal, when the animal is in the milking

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1 parlour. These means may be formed by metal or plastic tubes constituting a portion of the milking parlour frame.

In addition, according to the invention, the means for milking the animal may be arranged for milking it 5 automatically four or more times a day.

In accordance with a further characteristic of the invention, the teat cups of the milking cluster can be rotatable around a substantially upwardly directed shaft, hydraulic drive means, may be provided for this rotation. 10 Thus, the teat cups can be adjusted relative to each other to a position adapted to the udder of the relevant animal, prior to applying the milking cluster.

In accordance with a characteristic of the invention, the milking cluster can be adjustable in substantially 15 the vertical direction by means of a quadrangle hinge-construction, the quadrangle hinge-construction possibly being in the form of a parallelogram. This quadrangle hinge-construction may be provided near the milking cluster. Alternatively, in accordance 20 with another characteristic of the invention, the milking cluster may be arranged capable of movement in the lateral direction.

In accordance with a characteristic of the invention, the hinge pin of the milking cluster may be 25 fastened in the side wall of the milking parlour, so that the milking cluster can be swivelled to a high position, it then being possible for the animal to pass under the milking cluster.

Preferably, the milking procedure proceeds automatically. 30 For this purpose a computer can be used which is programmed such that all control operations proceed automatically.

If an animal, such as a cow, is to be milked, it passes through the entrance door at the rear end of the 35 milking parlour. As soon as the cow is in the milking parlour the door is automatically closed. The cow is then stationed with one hind leg at one side of a raised portion in the centre of the milking parlour and the

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1 other hind leg at the other side of the raised portion in the centre of the milking parlour.

A flap extending approximately horizontally in the milking parlour floor is moved hydraulically, so that the flap is then in an upward direction. As a result thereof, the cow can not advance its hind leg and thus disturb the milking procedure with the hind leg.

The central raised portion is formed by two parts. One part is hydraulically movable to the left, the other part is hydraulically movable to the right. When these parts are moved, the hind legs of the cow are also moved in the lateral direction.

Because of this forced, lateral movement of the hind legs it is inter alia achieved that the animal can not stand on one hind leg and consequently the centre of the animal is positioned in the centre of the milking parlour, and that a space is created through which the milking cluster can advantageously be connected to the animal's udder from its rear.

20 As soon as the cow has been milked, the milking cluster moves in the rearward and upward direction to such a height that another animal can pass under it. The raised portion at the hind legs moves back to the centre again. The flaps which were moved to in front of the 25 animal's legs move back again to an approximately horizontal position.

The exit door at the front of the milking parlour opens. The animal leaves the milking parlour and when the entrance door of the milking parlour opens another cow 30 can enter again and be milked automatically.

During milking the cover device bears on the stop against the wall. As soon as the cow has been milked, the milking cluster is moved to the rear until the milking cluster is under the cover device. Then a second stop 35 fastened to the arm of the milking cluster bears against the arm of the cover device and thus the milking cluster together with the cover device on top of it are moved to the rear in a safe manner, without it being possible for

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1 the milking cluster to be fouled. This is of particular interest when the milking cluster must be passed through the hind legs of the animal, for example a cow, for connection to the animal's udder.

5 For a detailed description of the invention, an embodiment of the implement for milking animals will now be described, by way of example, with reference to the accompanying drawings.

Figure 1 is a top view of an implement for milking 10 animals;

Figure 2 is a cross-sectional view along the line II - II of Figure 1 of the implement, a cow being shown which has a milking cluster connected to the udder;

Figure 3 shows a part of Figure 2, containing 15 further details;

Figure 4 is a view according to the arrow IV in Figure 1;

Figure 5 is a view of the implement corresponding to Figure 4;

20 Figure 6 shows a further detail of the implement, the milking cluster being connected to the udder;

Figure 7 is an elevational view along the line VII - VII in Figure 6;

25 Figure 8 shows a detail corresponding to the line VIII - VIII in Figure 7, and

Figure 9 shows a detail corresponding to the line IX - IX in Figure 3.

In the different figures, which illustrate the embodiment schematically, corresponding components are 30 given the same reference numerals.

As is shown in Figure 1, the implement for milking animals has two side walls 1, 2, to which guide rods 3, 4 are connected, between which an animal, for example a cow, may be present. At its front end the milking parlour 35 has a manger 5, in which fodder, for example concentrated fodder, can be fed in doses with the aid of means, not further shown.

As will be apparent from Figure 2, the manger 5 is

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1 connected to an exit door 6 which can be moved by means of swivel arms 7 to such a position that an animal which leaves the milking parlour can pass under it. To that end, the swivel arms 7 are fitted at one end to the side walls 1, 2 by means of hinges 8, whilst the other ends of the swivel arms 7 are fitted to the entrance door 6 by means of hinges 9. Using drive means, not further shown, the exit door 6 can be opened and closed automatically or manually, as the case may be.

10 Near the place where the animal's fore legs may be positioned, the milking parlour floor 10 is provided with a flap 11, which in Figure 1 and Figure 2 is shown in its upward position. By means of the hydraulic or pneumatic cylinder 12 the flap 11 can be rotated around the substantially horizontal hinge pin 13. As a result thereof the flap 11 can be adjusted to a substantially horizontal position, the flap 11 then being at least partly flush with the floor, whilst in the upwardly directed position, as shown in Figures 1 and 2, the flap may constitute a stop against which the fore legs of the animal present in the milking parlour bear, as is shown in Figure 2.

Near the position where the hind legs of the animals may be, the floor of the milking parlour has two flaps 14, 15 which each constitute a stop for one of the hind legs. Also these flaps 14, 15 are movable by means of hydraulic or pneumatic cylinders 16 from a substantially horizontal position, the flaps then being, at least partly flush with the floor 10, to a substantially vertical position, as is shown in the Figures 1 and 2.

30 In addition, near the place where the animal's hind legs may be positioned, the milking parlour may have two guide plates 17, 18 which extend in the upward direction and in the longitudinal direction of the milking parlour. By means of hydraulic or pneumatic cylinders 19 the two guide plates 17, 18 can be moved from a central position, in which the guide plates are at a short distance from each other, to a position in which they are remote from each other, which position is shown

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1 in Figures 1 and 2.

As will be described in greater detail herein-after, the flaps 14 and 15 are provided in milking parlour floor portions which together with the adjacent 5 guide plates 17 and 18, can move away from each other in the lateral direction, so that the hind legs of an animal present in the milking parlour are moved apart. Each of the hind legs of the animal is positioned on a laterally movable portion of the floor.

10 When the guide plates 17, 18 have been moved away from each other in the lateral direction, so that the situation shown in Figures 1 and 2 has been obtained, the milking cluster 65 can be applied from the space between the two guide plates 17, 18, as will be described in 15 greater detail in the sequel.

The implement furthermore comprises guide rods 20, which substantially extend over the animal in the milking parlour. These guide rods 20 may prevent the animal from making such movements that it steps over the flaps 11, 14 20 when in the vertical position. In addition, the guide rods 20 are provided with a mechanism which can bear against the posterior of the animal in the milking parlour. This mechanism is formed by a substantially U-shaped rod 21, which near its end is fastened by means 25 of hinge pin 22 to the guide rods 20, this pin 22 extending substantially transversely of the milking parlour in the horizontal direction. The U-shaped rod 21 can be moved by means of the hydraulic or pneumatic cylinder 23, one end 24 of which is connected, capable of hinging 30 to a guide rod 20, whilst the other end is connected by means of hinge point 25 to a lever 26 fitted to the U-shaped rod. By means of the operating cylinder 23 the U-shaped rod can be moved from a substantially vertical position, in which the U-shaped rod bears against the 35 posterior of the animal in the milking parlour, to an upward position, as shown in Figure 3 by means of broken lines, it being possible for the animal, when it enters the milking parlour, to pass under the U-shaped rod 21.

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1 After the animal has arrived in the milking parlour the U-shaped rod 21 can be moved down and push with a predetermined force against the animal, so as to drive it forward to the desired location. It is alternatively 5 possible to move the U-shaped rod to a predetermined position, depending on the animal, so that the relevant animal can be positioned in the desired forward position.

The means for applying the milking cluster 65 have a substantially U-shaped frame 27 whose end is fastened 10 to the side walls 1, 2 of the milking parlour by means of hinge points 28. The U-shaped frame 27 incorporates a supporting arm 29 which carries the milking cluster 65. The U-shaped frame 27 together with the supporting arm 29 and the milking cluster fastened thereto is capable of 15 swivelling around hinge points 28 from an operative position, as shown in Figure 1, 2 and 3, to an in-operative position which is shown in Figure 3 by means of broken lines. For that purpose a hydraulic or pneumatic operating cylinder 30 is provided which is fastened by 20 means of hinge 31 to the side wall 1, 2 of the milking parlour and whose other end is fastened by means of hinge 32 to a lever 33 fitted on the U-shaped frame 27. As can be seen from Figure 1, two operating cylinders 30 are provided, one on either side of the milking parlour.

25 A second, substantially U-shaped frame 34 is provided, capable of free rotation, by means of the hinges 28. A cover member 35 which is substantially constituted by a plate-shaped portion is fastened to this U-shaped frame 34. When the milking cluster 65 together with its 30 supports 27, 29 is in the operative position, as shown in Figure 3, the frame 34 bears against a stop 36 provided at the side wall 1, 2 of the milking parlour. In this position, the cover member 35 will be capable of catching any excrements of the animal. When the frame 27 is 35 swivelled to its inoperative position, by means of the operating cylinder 30, the milking cluster 65 will move towards the cover member 35, whereafter the frame 24 comes into contact with carrier member 37 connected to

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1 the U-shaped frame 27. As a result thereof, the frame 34
is lifted from the stop 36 and the moving frame 27
carries it in the upward direction, so that the position
indicated in Figure 3 by means of broken lines is reached.

5 The Figures 4 and 5 schematically show a rear view
of the implement. Both Figures show the substantially
U-shaped rod 21 in its downward position. The milking
cluster support and the cover member are shown in Figure
4 in the operative position and in the inoperative
10 position in Figure 5. In addition, a milk container 38 is
shown which is connected to the milking cluster through
pipe 39.

Figure 5 shows the guide plates 17, 18 in the
position in which they are at a short distance from each
15 other. The guide plates 17, 18 can be moved apart to the
position shown in Figure 4, by means of operating
cylinders 19. As is illustrated by Figures 4 and 5, the
flaps 14 and 15 which are shown in the vertical position
move laterally together with the guide plates 17 and 18,
20 respectively. Also the floor portion near the flaps 14
and 15 perform the same movements.

Figures 6 and 7 show the milking cluster 65 and
the manner in which they are fastened to supporting arm
29 in greater detail. The milking cluster is fastened to
25 the supporting arms 29 by means of a parallelogram con-
struction, which parallelogram construction has four con-
necting elements 40 which extend substantially in
parallel with each other and are fastened capable of
30 swivelling to a supporting element 41 which is slidably
connected to supporting arm 29, and also to the support
42 for the teat cups 43. The support 42 of the teat cups
43 is laterally movable because supporting element 41 can
perform a corresponding movement relative to the support-
ing arm 29. To this end, a hydraulic or pneumatic
35 operating cylinder 44 is provided, one end of which is
connected to the supporting element 41 and the other end
to the supporting arm 29. The support 42 of the teat cups
43 is movable in the vertical direction by means of the

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1 parallelogram construction, which vertical movement can be controlled by operating cylinder 45, one end of which is connected capable of swivelling to the supporting member 41 and the other to the support 42, which support 5 42 is furthermore rigidly connected to an arm 46 at whose end a sensor or indicator 47 is provided. It will be clear that in the described manner the support 42 can be adjusted to any desired position, which position corresponds to the position of the sensor 47. In the embodiment shown the animal is provided with two orientation means 48 arranged on its skin. These orientation means 48 may comprise a small transmitter transmitting signals which are received by the sensor 47, so that the position of sensor 47 relative to the orientation means 48 can be 15 recorded. Thus, the support 42 of the teat cups 43 can be controlled to a desired position relative to the animal present in the milking parlour, with the object of connecting the teat cups to the teats of the udder.

Relative to the support 42 each of the teat cups 20 43 is movable in a horizontal plane. To that end, each teat cup 43 can rotate around an associated vertical hinge pin 49. This swivelling motion is effected for each of the teat cups 43 by a pneumatic or hydraulic operating cylinder 50 associated with each of the teat cups 43. In 25 addition to this feature of moving the support in a horizontal plane, each of the teat cups is spring-loaded in the vertical direction, as each of the teat cups 43 is arranged capable of swivelling around horizontal pin 51 to the support 42. To that end, each of the teat cups is 30 provided with an arm which is swivable around hinge pin 51 and is supported by a helical spring 52. In the described manner, each of the teat cups 43 can move from a horizontal plane downwards by spring action, whilst in addition each of the teat cups can be adjusted in that 35 horizontal plane to a desired position relative to the other teat cups.

Prior to applying the milking cluster 65, the teat

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1 cups 43 are brought to the appropriate position for the relevant animal. This position can be manually adjusted, it is however alternatively possible for the required data of the animal to be stored in a computer, so that 5 the correct position of the teat cups can be automatically adjusted after the animal present in the milking parlour has been recognized by electronic means. Not only the relative position of the teats of the udder to each other, but also the position of the teats relative to the 10 orientation means 48 may have been processed as data in a computer, so that the milking cluster, after the teat cups have been adjusted to the appropriate position, can be applied in the correct place relative to the udder in the upward direction, controlled by the computer.

15 So as to facilitate applying the teat cups 43, the teat cups 43 have funnel-shaped catching means 53 made of flexible material. The flexible catching device 53 may be an integral part of other flexible portions 54 of the teat cups. As can be seen from Figure 6, the funnel-shaped catching device 53 has interconnected annular portions 55 of different diameters. Thus, the shape of the flexible catching device can be easily adapted to the shape of the udder near the relevant teat.

Figure 8 shows a further detail of the mode in 25 which the supporting element 41 is connected to supporting arm 29. This Figure shows that supporting arm 29 has a flange 56. A profiled beam 57 which is guided capable of movement in guide members 58 connected to the flange 56 is connected to supporting element 41. Operating 30 cylinder 44 has one end connected to flange 56 and the other end to the supporting element 41, so that loading the cylinder causes the supporting element 41 to shift relative to the supporting arm 29.

Figure 9 illustrates a further detail of Figure 4. 35 The flaps 15 and 18 are shown in their upward positions. Both flaps are fastened to the moving portion 59 of the milking parlour floor, which portion is laterally movable by means of hydraulic or pneumatic operating cylinder 19,

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1 which has one end connected to a support 60 fastened to
the fixed portion of the milking parlour floor and the
other end to the support 61 fastened to the movable
portion 59 of the floor. Figure 9 also shows the operat-
5 ing cylinder 16 for operating the flap 15. A sensor 62 is
provided in the movable portion 59 of the floor so as to
make it possible to observe whether the hind legs of the
animal are at the desired place. For that purpose sensor
62 is connected by means of line 63 to an arrangement for
10 recording the signal produced by sensor 62.

The implement operates as follows:

Before an animal, a cow in the example, enters the milking parlour, the milking cluster 65 is adjusted to its inoperative position and the U-shaped rod 21 is also in its raised position, so that the cow can pass under both elements. In addition, the guide plates 17, 18 which extend in the longitudinal direction of the milking parlour and substantially in the vertical direction, have been adjusted to the position shown in Figure 5, that is to say they are adjusted such that they are near to each other in the centre of the milking parlour. In addition, the flaps 14, 15 are in the substantially horizontal position and the flap 11 is in the upward direction. The exit door 6 is closed, so that the manger 5 is at the front of the milking parlour. When the cow enters the milking parlour it will advance as far to the front as possible in order to bring its head to the manger 5.

Doing so, the cow will automatically place its fore legs near the flap 11. Thereafter the flaps 14 and 15 are adjusted to the upward position and the U-shaped rod 21 is moved down. If a hind leg of the cow is positioned on a flap 14, 15, this leg will slide from the flap when the latter is adjusted to the upward position, and arrive in the desired place. After the flaps 14, 15 have been adjusted to the upward position and the U-shaped rod 21 bears on the posterior of the cow, the movable portions 59 of the floor move laterally, thus creating a space between the guide plates 17 and 18. As a

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1 result thereof, the hind legs of the animal are also
moved apart. The sensors 62 can detect whether the two
hind legs are in the appropriate place, whereafter the
milking cluster can be connected. For that purpose it is
5 determined by means of electronic means which cow is
present in the milking parlour, for example by means of a
collar provided around the cow's neck, comprising an
information carrier or, as shown in the embodiment, one
10 or more information carriers 48 which at the same time
form part of the orientation means, and which are, for
example, provided at the double skin of the cow near the
hind legs.

Depending on the cow present in the milking parlour,
15 the milking cluster is adjusted, that is to say the
teat cups are positioned relative to each other.

The milking cluster moves from the inoperative
position to the operative position by swivelling down of
the U-shaped frame 27, the cover device 35 moving to-
gether with the milking cluster until the frame 34 of the
20 cover device 35 bears against the stop 36. The milking
cluster then moves further under the cow, between the
guide plates 17 and 18. This causes the milking cluster
19 to be adjusted in a position under the udder of the
cow, which position depends on the cow present in the
25 milking parlour, whereafter the milking cluster is moved
upwards until the teats are located in the teat cups.

It is alternatively possible for the travel of the
milking cluster to the udder of the cow to be partially
30 or fully determined by the orientation means which detect
the position of the milking cluster relative to the
udder. To that end the sensor 47 pulls-in signals pro-
duced by the orientation means 48, and in response to
which the sensor 47 can determine its position relative
35 to the orientation means 48. The milking cluster already
adjusted for the relevant cow can for that purpose move
in any direction, in the longitudinal direction of the
milking parlour by means of swivelling of the U-shaped
frame 27, in the lateral direction relative to the milk-

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1 ing parlour by means of operating cylinder 44, and in the
upward direction by means of operating cylinder 45.
During the upward movement of the milking cluster the
individual teat cups can move down by spring action,
5 which will occur when the relevant catching device 53 is
bearing against the cow's udder.

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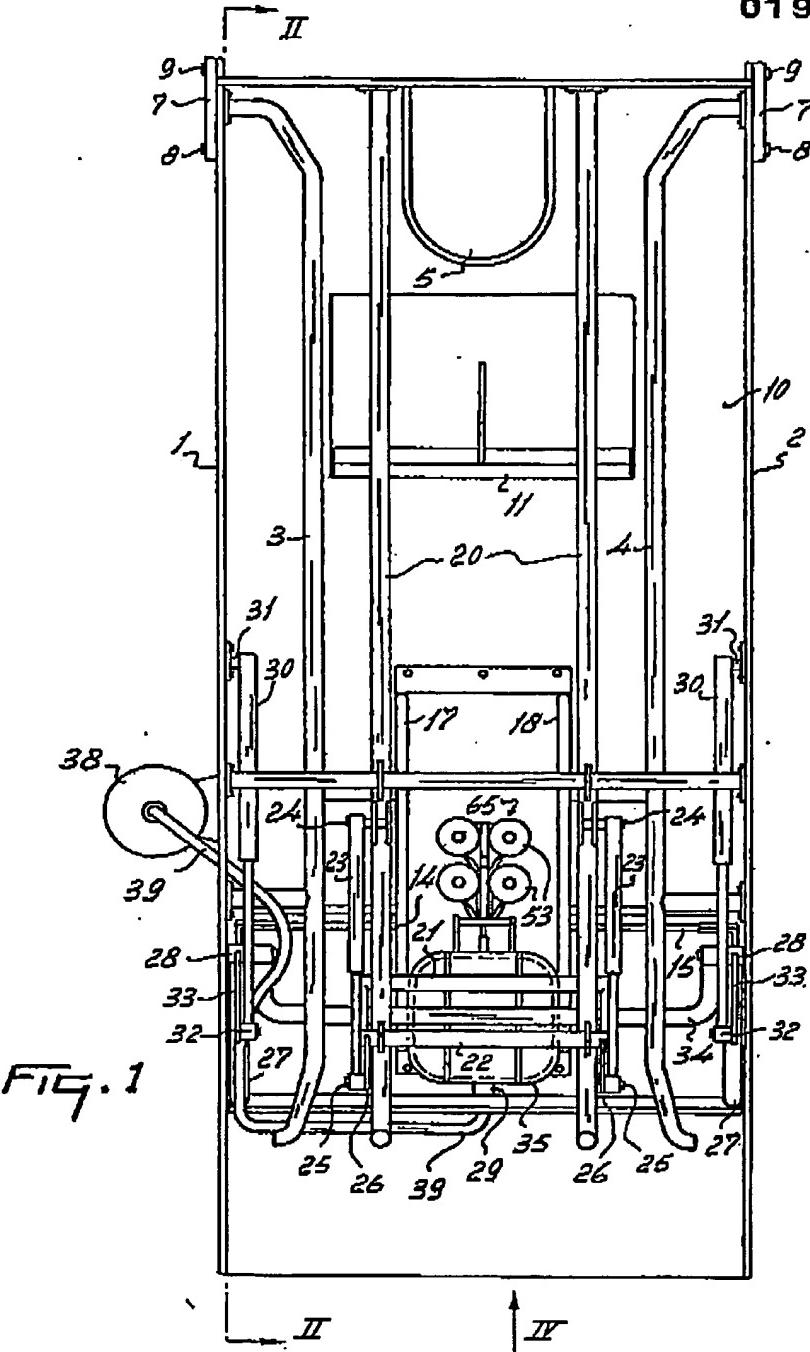
01947291 CLAIMS:

1. An implement for milking animals, such as cows, comprising at least one milking parlour and at least one milking machine, characterized in that the milking parlour includes means for forcing the animal to move at least one hind leg in the lateral direction.
2. An implement as claimed in claim 1, characterized in that these means have two upwardly directed walls.
3. An implement as claimed in claim 2, characterized in that one wall is capable of hinging up and down.
4. An implement as claimed in claim 2 or 3, characterized in that a wall extends upwardly and is fixed to a movable portion of the milking parlour floor.
5. An implement as claimed in claim 4, characterized in that the floor portion can move laterally for approximately 20 cms.
6. An implement as claimed in any one of the preceding claims, characterized in that the displacement means have two portions which are movable in opposite directions.
7. An implement for milking animals, such as cows, comprising at least one milking parlour and at least one milking machine, characterized in that the milking parlour includes one or a plurality of sensors which are arranged such that it can be detected whether legs of the animal are in a predetermined place.
8. An implement as claimed in claim 7, characterized in that the sensors are provided on either side of a central raised portion of the milking parlour floor.
9. An implement as claimed in claim 7 or 8, characterized in that the sensors are provided on a movable portion of the milking parlour floor.
10. An implement as claimed in any one of the preceding claims, characterized in that the milking parlour floor has an upwardly hinging flap before the animal's fore legs.

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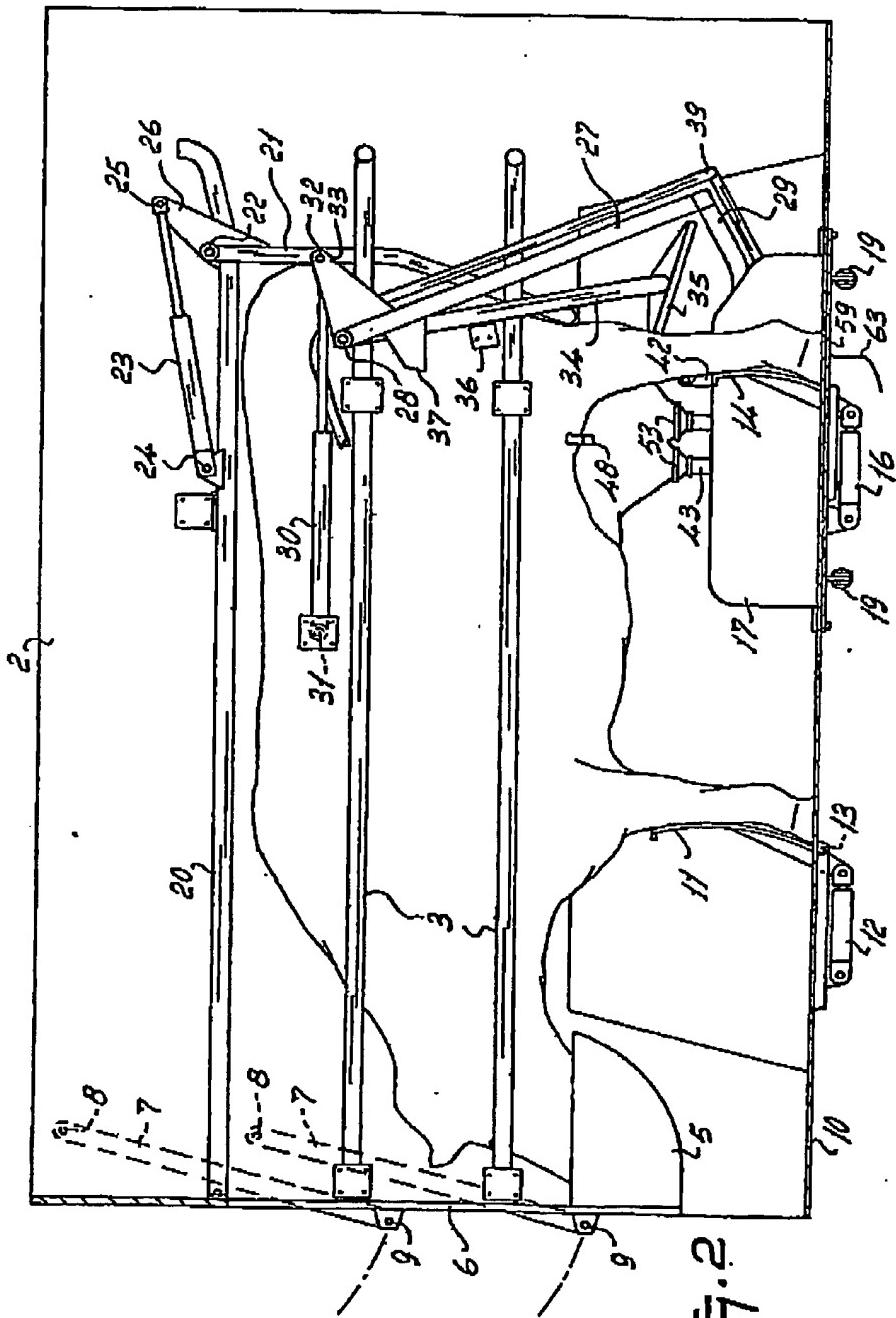
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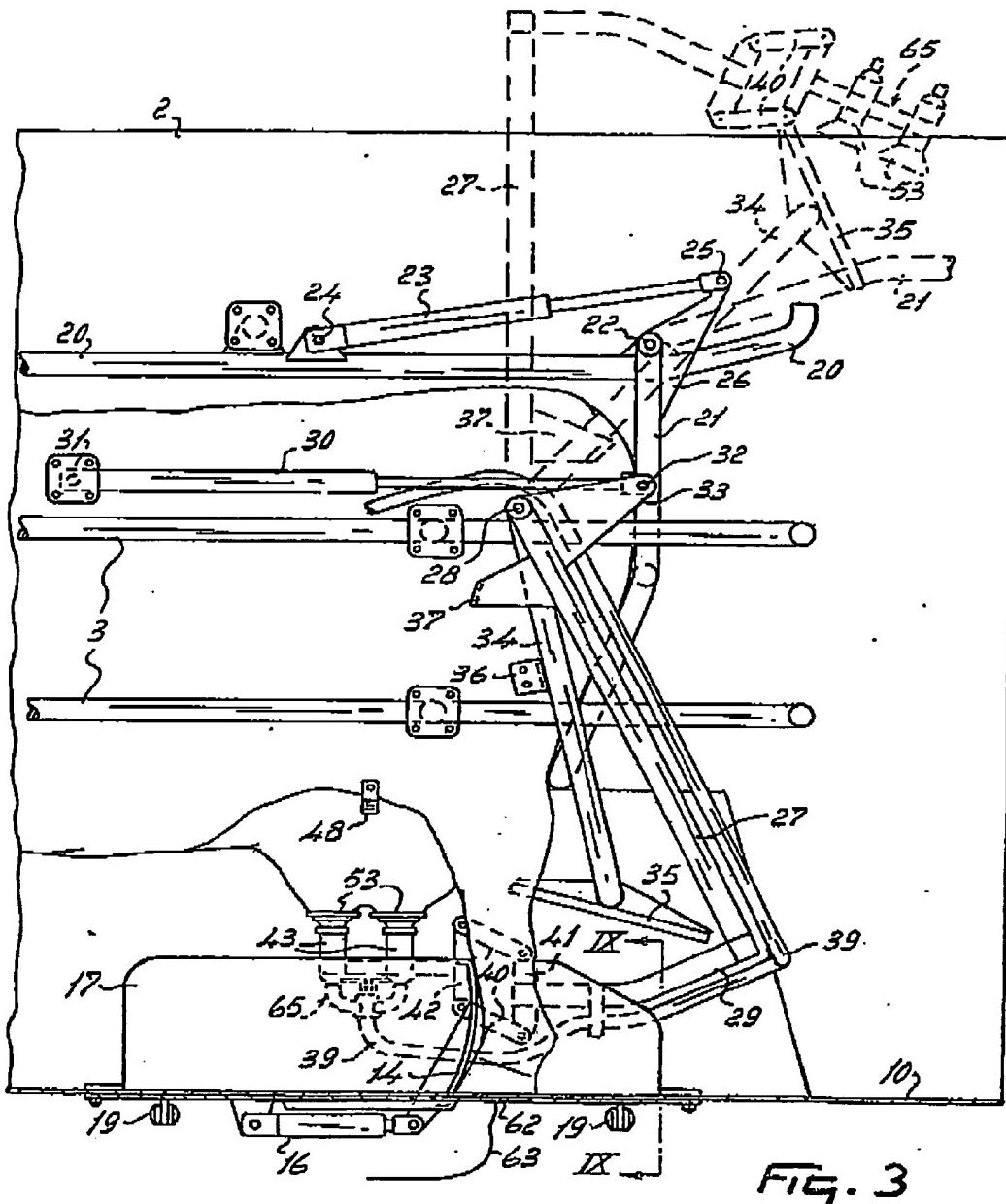


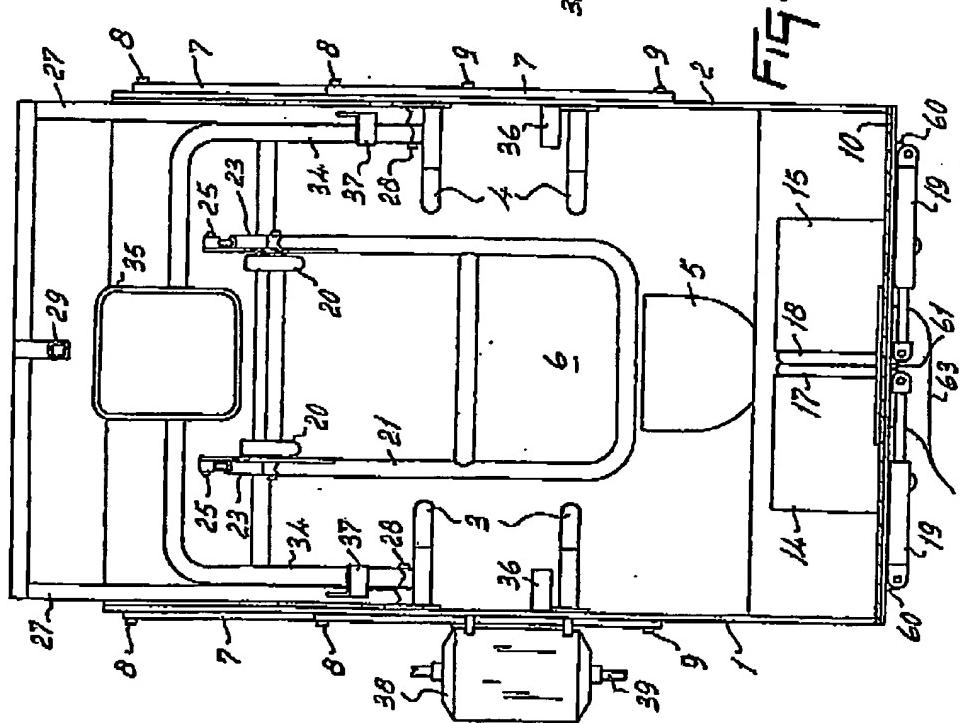
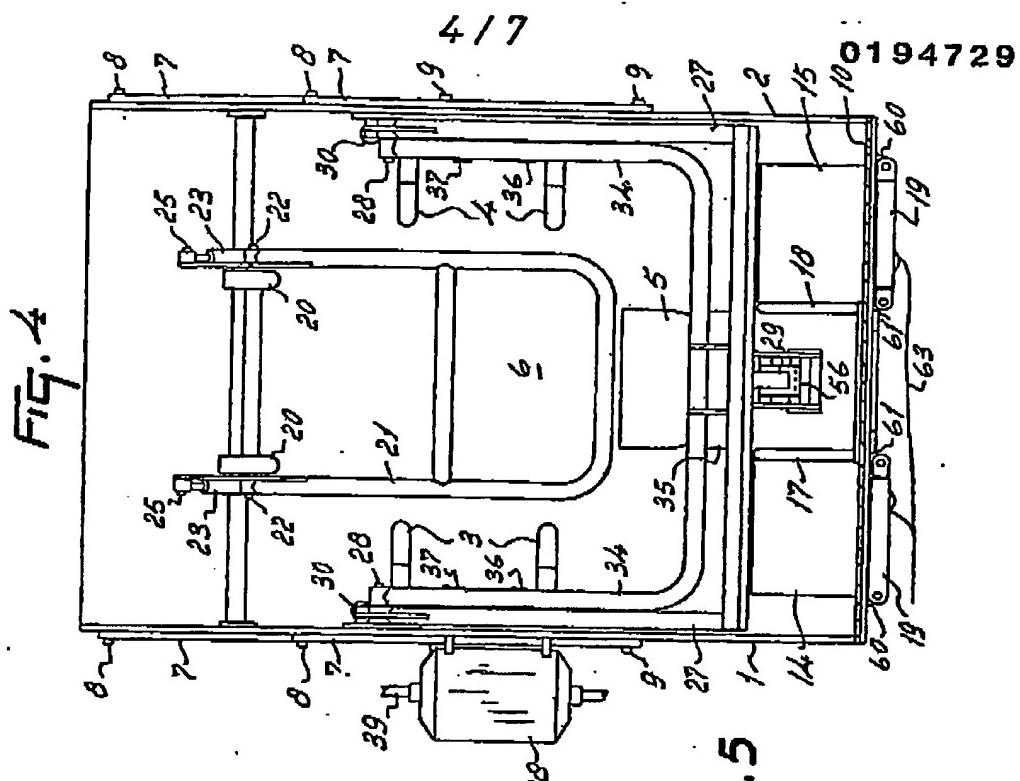
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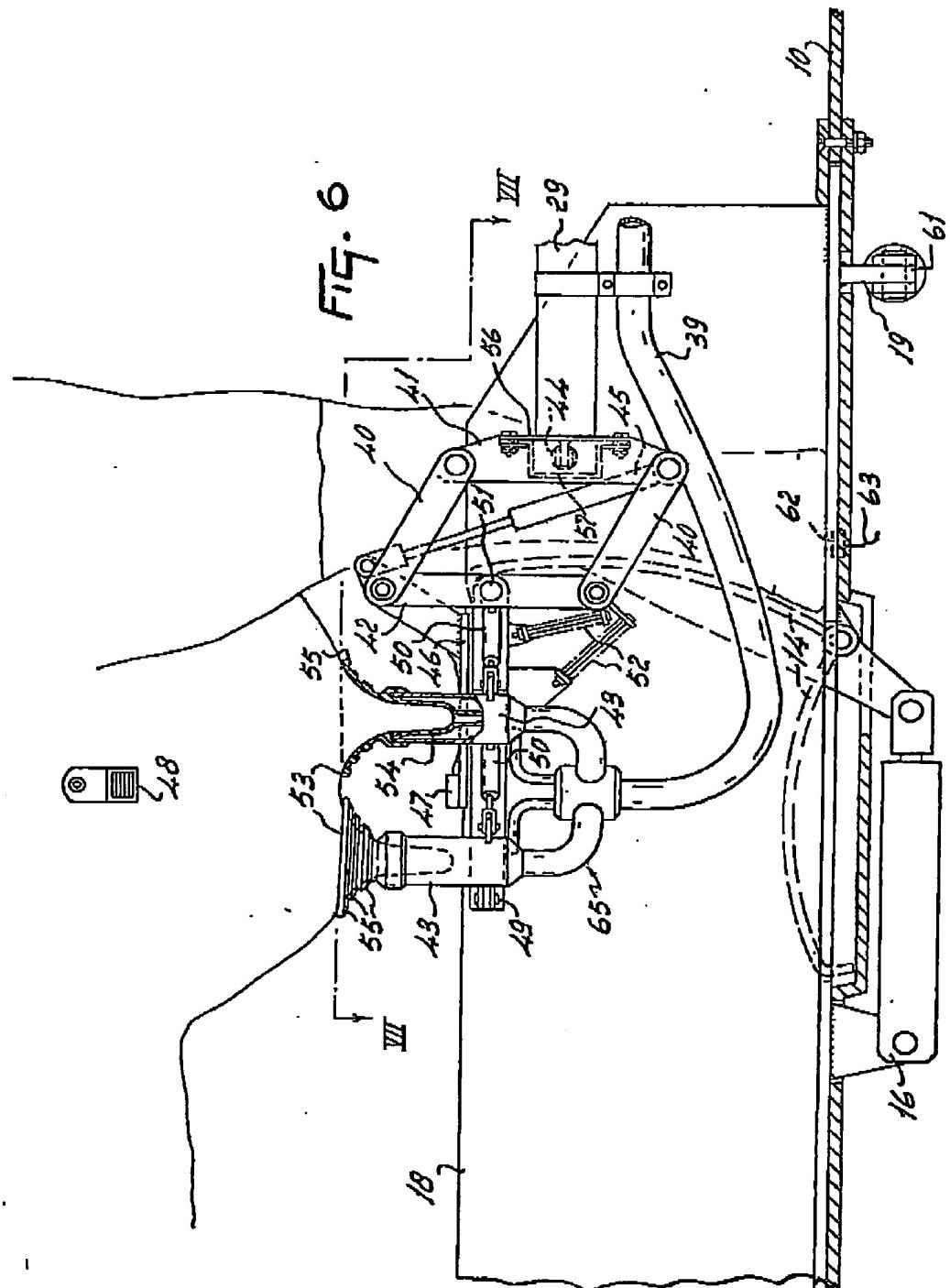
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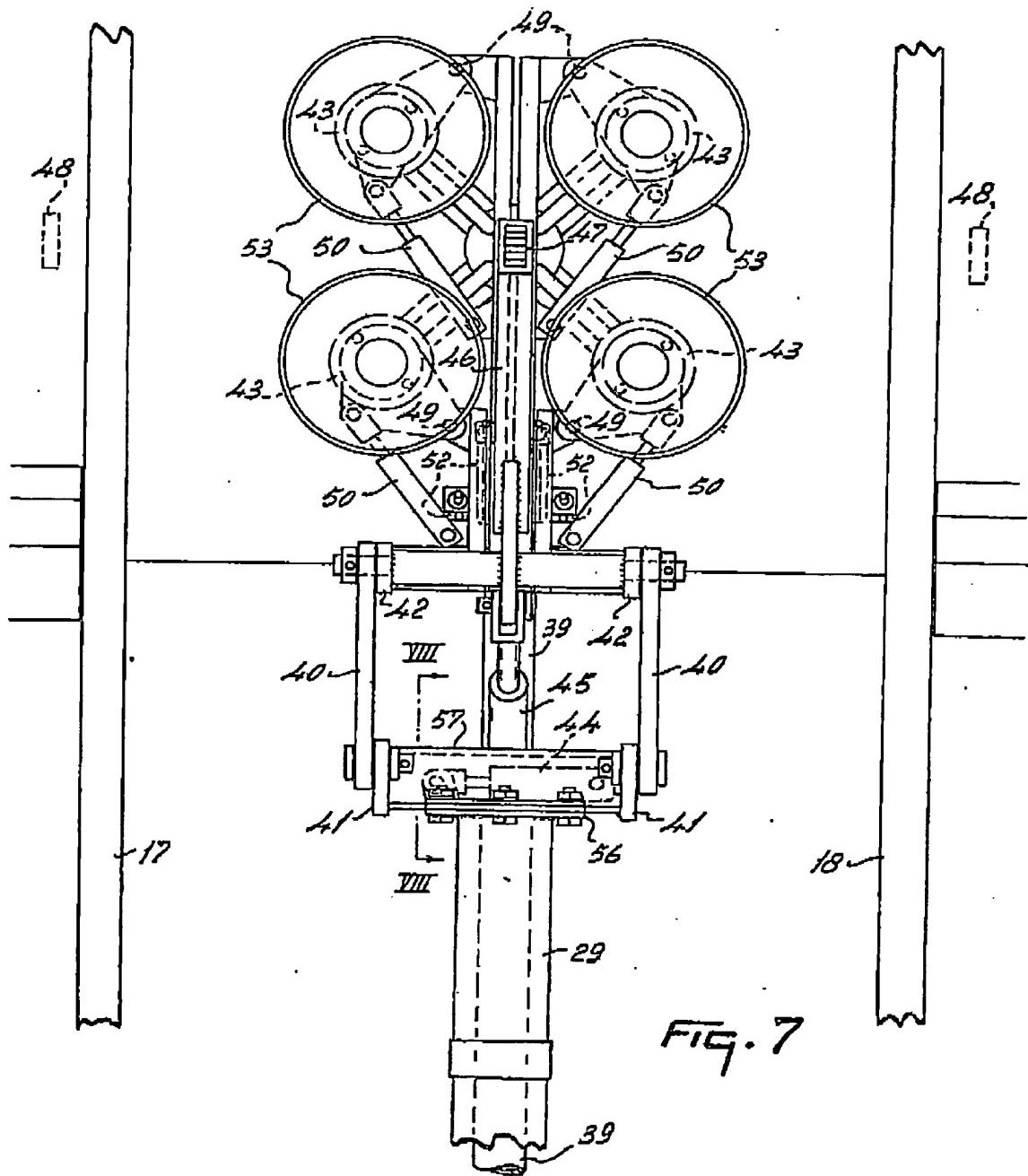


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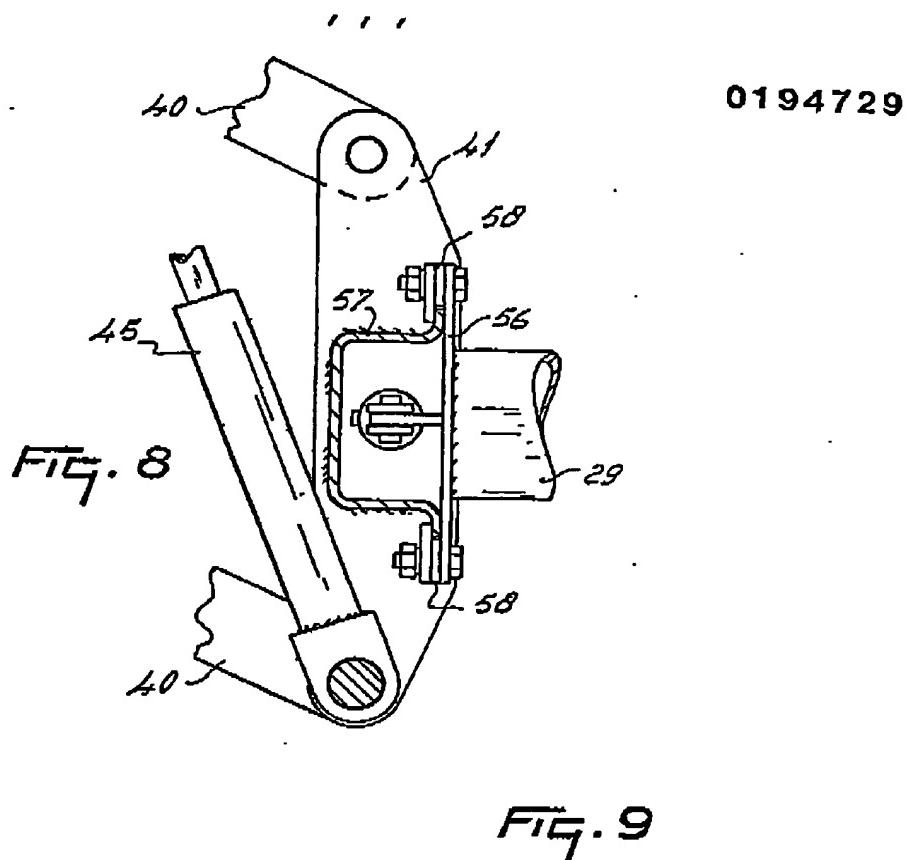
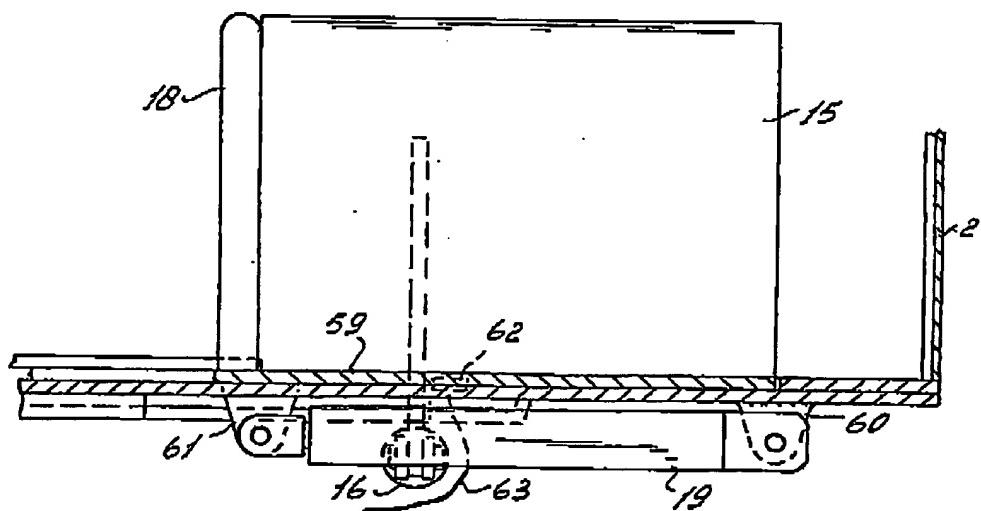


FIG. 9





European Patent
Office

EUROPEAN SEARCH REPORT

0194729
Application Number

EP 86 20 0390

DOCUMENTS CONSIDERED TO BE RELEVANT									
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.)						
X	US-A-4 010 714 (I. NOTSUKI et al.) * Column 4, lines 54-64; column 5, line 67 - column 6, line 5; figures 1,5,6 *	1-3	A 01 J 7/00 A 01 K 1/12						
X	DE TELEGRAAF, 4th December 1984, page T23; E. BOS: "Land- en tuinbouw"	1-3							
A	US-A-3 763 828 (P.R. TIGHE) * Column 2, lines 45-57; figure 2 *	7							

TECHNICAL FIELDS SEARCHED (Int. Cl.)									
A 01 J A 01 K									

<p>The present search report has been drawn up for all claims</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">Place of search</td> <td style="width: 33%;">Date of completion of the search</td> <td style="width: 34%;">Examiner</td> </tr> <tr> <td>THE HAGUE</td> <td>10-06-1986</td> <td>NEHRDICH H.J.</td> </tr> </table>				Place of search	Date of completion of the search	Examiner	THE HAGUE	10-06-1986	NEHRDICH H.J.
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CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background D : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons A : member of the same patent family, corresponding document							